ATTACHMENT 4

SANTA CLARA VALLEY WATER DISTRICT
FINAL DRAFT—WELL STANDARD

Supplement to
"Standards for the Construction and Destruction of Wells and other Deep Excavations In Santa Clara County"

STORM WATER INFILTRATION DEVICES

Upon adoption by the Board of Directors of Santa Clara Valley Water District, this Supplement shall be effective under Section 7.1 of Ordinance 90-1. The sections of this document beginning with "Definitions" shall be appropriately incorporated into the next revision of "Standards for Construction and Destruction of Wells and other Deep Excavations in Santa Clara County" (District Well Standards).

Objective

As stated in the Introduction to the District Well Standards, available from Santa Clara Valley Water District Well Section, improperly constructed wells can be conduits for chemical migration resulting in groundwater contamination. The primary objective of the District Well Standards is to protect groundwater from the hazard of contamination by ensuring proper siting and proper construction of all types of wells.

Background

Storm water infiltration devices, such as storm water drainage wells (dry wells), have been commonly used to dispose of surface drainage water to the underground. They are used to receive surface drainage in areas of insufficient slope where normal runoff patterns may cause temporary ponding. Storm water infiltration devices are also used to by-pass surface soils that restrict drainage because of high clay content. Storm water drainage wells are sometimes used in conjunction with holding ponds or settling ponds and chambers. Storm water infiltration devices have also been used to provide temporary drainage of local areas undergoing new development until positive drainage to a new storm sewer could be provided.

Infiltration wells and galleries are sometimes used to accelerate the cleanup process at chemical spill sites. These devices allow infiltrating water to leach chemicals in the soil to the groundwater where the pollutants can be removed by groundwater pumping. The groundwater mound created by infiltrating water is sometimes used to control or direct the groundwater gradient toward extraction wells. Such operations are regulated by the Regional Water Quality Control Boards, Cal-EPA Department of Toxic Substances Control (DTSC), U.S. EPA, or other regulatory agencies. These activities are not included in this protocol, nor are these infiltration wells, trenches, or galleries considered to be storm water infiltration devices.

The storm water drainage well standard supplement to the District Well Standard does not include storm water drainage sumps, unlined storm water retention or detention ponds, lined catch basins, percolation ponds operated by the District, or naturally occurring surface water bodies and wetlands. Storm water infiltration devices exempted from the permitting process are residential roof and building entryway drains, and tree root watering holes less than 10 feet deep.

Protection of Groundwater Quality

Optimum conditions for locating storm water infiltration devices are where the depth to first groundwater is substantially below the bottom of the storm water drainage well or other infiltration device. The greater the unsaturated thickness and degree of stratification below the bottom of the drainage well, the more groundwater quality will be protected from polluted[1] or contaminated water by natural attenuation processes through the unsaturated zone. As the infiltrating water slowly passes through unsaturated soils, the water and pollutants are subject to a variety of attenuating natural treatment processes including; aerobic biochemical transformations, oxidation, adsorption, filtration, and/or other physical and chemical processes which remove or degrade pollutants. This process is referred to as "natural protection" of groundwater. If the unsaturated thickness beneath the well is not adequate to provide sufficient attenuation, the result may be that polluted or contaminated water is injected directly into groundwater.

Under the State Water Code (Sections 13263.5 and 13382) and the Health and Safety Code it is prohibited to allow chemicals to enter injection wells, including storm water drainage wells, without waste discharge requirements. The unregulated discharge of pollutants is illegal and State Water Code Section 13263(g) provides the authority to require the proper destruction of storm water drainage wells. Under State Water Code Section 13801(c) local agencies were required to adopt a well standard ordinance which meets or exceeds the State Well Standard (Bulletin 74-81, amended to 74-90) before January 15, 1990. The District Ordinance 90-1 and the District well standards were already in place. On September 16, 1992 the Regional Board adopted an amendment to the San Francisco Bay Basin Water Quality Control Plan titled "Shallow Drainage Wells." The Regional Board Shallow Drainage Well Program consists of two main elements; 1) locating existing wells, and 2) regulating existing wells and new wells. This District program to develop standards for storm water drainage wells and to coordinate with the cities and county is in response to the new Basin Plan requirements.

Potential Performance Problems of Storm Water Infiltration Devices

It is recommended that storm water drainage wells only be considered as a short term, interim measure for disposing of storm water due to several performance problems that often occur. During normal operation of storm water drainage wells, the filter pack eventually becomes clogged with particulates or organic growth, reducing well performance below the expected design capacity. As a result, the well will fail to adequately dispose of storm water and flooding may occur. In some areas, a high percentage of storm water drainage wells have failed because of siltation, some even within months after construction.

Settling basins have been used to remove silt from water entering storm water drainage wells, thereby prolonging the well's operational life. Depending on the size of the settling basin or tank, a high level of maintenance may be required to remove the accumulated silt from the settling basin. High flows may overwhelm the settling effect and turbid water will be discharged into the well, with the eventual inevitable failure, despite engineered features and intensive maintenance.

During construction of storm water drainage wells the mechanical action of the drilling on moist soils may cause a clay smear or clogging of the natural formation. Unlike water wells, dry wells cannot be developed to improve their performance after construction nor can they be re-developed if they clog due to operation.

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[1] Defined in California Water Code Section 13050(l)

(Add to page 2 of District Well Standards after "Recharge or Injection Wells")

Definitions

Bubble-up

A bubble-up is a structure designed to transport storm water from a gutter or other storm water conveyance system below ground into another gutter or storm water conveyance system, or to a storm water detention pond. A typical bubble-up consists of two risers connected by a pipe beneath grade. The inlet of the upstream riser is higher in elevation than the outlet of the downstream riser allowing water to move freely through the system by gravity. After a storm the bubble-up remains filled with water which infiltrates to the subsurface through the open (unlined) bottoms of the two risers. Bubble-ups are considered storm water drainage wells under these Supplemental District Well Standards.

Catch Basin

Lined structures intended to collect sediment and other material in storm water drainage and conveyance systems.

Dry Well

See Storm Water Drainage Well.

French Drain

See Infiltration Trench.

Infiltration Trench or Infiltration Gallery

A trench or system of interconnected trenches (gallery) backfilled with sand or gravel, which may contain perforated pipe (well screen), used for the purpose of injecting or infiltrating water into the subsurface. If the water entering the trench or gallery is surface runoff, then the structure is considered a storm water drainage well under these Supplemental District Well Standards.

Percolation Pond

A pond or other facility operated and managed by Santa Clara Valley Water District for the purpose of recharging groundwater basins. Percolation ponds are not normally operated during storm events because of excessive turbidity in the storm water.

Shallow Drainage Well

See Storm Water Drainage Well.

Storm Water Detention Pond

A settling pond or holding pond that temporarily stores water to reduce peak storm flows and/or allow particulates (turbidity) to settle. A detention pond is designed to drain to a storm sewer, stream channel, or other storm water conveyance system.

Storm Water Infiltration Device

Any structure or device that is designed to collect storm water, or other drainage water, and infiltrate that water or a portion of that water into the subsurface. The definition of storm water infiltration device does not include any type of septic system or other degraded water disposal system, any infiltration or injection of water other than storm water drainage or surface run-off, nor does it include storm water detention or retention ponds, District percolation ponds, lined storm water drainage sumps, lined catch basins, or any naturally occurring body of surface water, including wetlands. Underground utility vaults which are not intended to collect storm water are excluded from this standard.

Storm Water Drainage Sumps

Lined storm water collection points or structures from which the storm water is pumped to another location.

Storm Water Drainage Well

A storm water drainage well is a structure placed in an excavation or boring which collects storm water and infiltrates all or part of that storm water into the subsurface. Storm water drainage wells may also be called dry wells, shallow drainage wells, storm water infiltration devices, bubble-ups, disposal wells, and other similar terms. Storm water infiltration trenches and galleries, sometimes called "french drains," are included in this definition. Unlined bubble-ups are included in this definition. Thus when the term storm water drainage well is used in this supplemental standard, it specifically includes storm water infiltration trenches and galleries, unlined bubble-ups, and dry wells. Drainage wells (a.k.a. dry wells) and disposal wells are subclasses of US EPA Class V Injection Wells as defined in the Safe Drinking Water Act of 1974 and subsequent amendments (40 CFR 144.6(e)).

Storm Water Retention Pond

A pond designed and constructed for the purpose of storing storm water and subsequently infiltrating the storm water to the sub-surface. A retention pond will not fully drain to a storm sewer, stream channel, or other storm water conveyance system.

Well or Water Well

"Well" or "water well" . . ., means any artificial excavation constructed by any method for the purpose of extracting water from, or injecting water into, the underground. This definition shall not include: (a) oil and gas wells, or geothermal wells constructed under the jurisdiction of the Department of Conservation, except those wells converted to use as water wells; or (b) wells used for the purpose of (1) dewatering excavation during construction, or (2) stabilizing hillsides or earth embankments (from Water Code Chapter 10, Article 2, Section 13710).

(Add to page 14 of District Well Standards after "Elevator Shafts")

Standards for Storm Water Drainage Wells

General Siting and Construction Requirements

1. Storm water drainage well construction shall be allowed only in areas where the City or County has adopted a Memorandum of Understanding (MOU) with the District for an approved regulatory oversight and control program for storm water drainage wells. Santa Clara Valley Water District will not issue construction permits for storm water drainage wells unless the City or County having jurisdiction allows them, has adopted Part B of the MOU with the District, and has established a regulatory oversight and control program.

2. As a performance standard, the owner shall demonstrate, to the satisfaction of the District geologist, that a sufficient thickness of unsaturated zone is present to provide natural protection of the groundwater. An optional prescriptive standard is as follows:

    1) There shall be no less than thirty (30) feet of unsaturated zone between the base of the drainage well and the highest seasonal water table at the site, including perched zones; and
    2) The total depth of a storm water drainage well shall not exceed thirty (30) feet below the natural ground surface.

3. The District does not assume any risk or liability associated with the installation and operation of a storm water drainage well by issuing a construction permit or by processing a "Notice to Continue Use of a Storm Water Drainage Well." Any risk or liability are the full responsibility of the well owner. These risks are not limited to but do specifically include pollution of soil and/or groundwater and the occurrence of nuisance conditions as a result of the use and/or misuse of the well.

Siting Restrictions and Prohibitions

All storm water drainage wells shall be located an adequate horizontal distance from potential sources of contamination and pollution. Most of the factors involved in determining safe distances are usually not known. The following distances, on the basis of past experience and general knowledge, are safe where dry upper unconsolidated formations, less permeable than sand, are encountered. On this basis, areas and locations where storm water drainage wells are unsuitable or pose a serious threat to groundwater quality and where storm water drainage wells are therefore prohibited, are as follows:

1. Locations within two hundred fifty (250) feet of any water supply well.

2. Locations within two hundred fifty (250) feet of any septic tank, leach field, pit privy, or cesspool.

3. Locations where hazardous chemical storage, handling, or use exists within the area that drains to the storm water drainage well.

4. Locations within five hundred (500) feet of an underground tank or an above ground tank storing chemicals, a sanitary landfill, or a chemical waste disposal site. (Such locations may be approved by the District Geologist based upon site specific considerations).

5. Properties where a Hazardous Materials Business Plan (HMBP) has been issued, or where anticipated use of the property may reasonably include activities requiring a HMBP, are unsuitable

because of the wide variety and magnitude of contaminants from industrial uses, and the potential for accidental or purposeful disposal of these chemicals into a storm water drainage well.

6. Locations where polluted water or chemicals may discharge directly to the storm water drainage well. These locations shall be based on criteria developed in cooperation with the City or County under the MOU Part A.

7. On properties where chemical spills have occurred, or which are listed as a contamination case with the District, a Regional Water Quality Control Board, Cal-EPA DTSC, or the U.S. EPA.

8. At any location where the presence of a storm water drainage well may cause a change in the rate or direction of contaminant migration or a disturbance of plume management.

9. In locations where runoff from heavily irrigated agricultural or landscaped areas may enter the storm water drainage well. Pesticides and fertilizers used in agriculture and in landscaping in commercial areas may adversely impact groundwater.

10. Areas where direct infiltration of storm water has a potential to cause nuisance conditions or damage to property. Such conditions may include the creation of unstable hill slopes or stream banks, waters surfacing creating a hazard and vector problems, water surfacing along steep banks causing erosion, and high water table conditions causing waterlogging.

11. An exception to these requirements must be approved by the District geologist. Under certain circumstances, adequate protection of ground water quality may require more stringent standards than those presented here; under other circumstances, it may be necessary to substitute other measures which will provide protection equal to that provided by these standards.

Exclusions

This standard does not apply to storm water drainage wells which are less than ten (10) feet deep and which receive only roof drainage from single family residential property or building entry ways; that is, where the device and collection system are constructed in such a way that no drainage from surface water and/or landscaped areas can enter the roof drainage sump.

This standard does not apply to holes less than ten (10) feet deep installed for the purpose of watering the roots of trees.

This standard does not apply to lined municipal storm water catch basins, designed to collect sediment or debris in storm water conveyance systems, or to lined storm water drainage sumps.

Shallow storm water drainage wells, less than ten (10) feet deep, do not require permit, monitoring, and inspection, but are subject to all general siting and construction requirements, siting restrictions and prohibitions, annular space sealing conditions, and surface construction features. Rather than a permit, the owners of shallow storm water drainage wells shall file a "Notice to Continue Use of a Storm Water Drainage Well."

MATERIALS AND PROCEDURES

The section on "Materials and Procedures" for well construction beginning on page 16 of the "Standards for the Construction and Destruction of Wells and other Deep Excavations in Santa Clara County" and in the California Department of Water Resources Bulletins 74-1, 74-81, 74-88, and 74-90 apply to the construction of storm water drainage or drainage wells.

Annular Space Sealing Conditions

All storm water drainage wells over 5 feet deep must be cased and sealed in accordance with the District Well Standards. The established standards for annular space requirements, casing materials, centralizers, sealing materials, placement methods, etc. apply to storm water drainage wells. The minimum length of annular seal from the ground surface to the gravel packed interval is five (5) feet. The sealing material shall be neat cement, sand cement, or bentonite cement. Thick bentonite slurry is not an appropriate sealing material for storm water drainage wells because of desiccation problems near the surface. The filter material placed in or around the storm water drainage well screen shall be clean and consist of a material acceptable for use with water supply wells.

Storm water drainage wells which are constructed without casing, such as bubble-ups and french drains, the cement sides of the structures shall be poured in direct contact with the native soil.

Surface Construction Features

The surface completion for storm water drainage wells over 5 feet deep shall consist of a concrete pad at least one (1) foot thick and two (2) feet wider than the outer casing around the well inlet structure or settling chamber, unless the inlet structure is located in a paved area. Site specific design and operation criteria may dictate additional requirements at the owners discretion. The well head shall be permanently marked with the legend "NO DUMPING-GOES TO DRINKING WATER" and the State Well Number in a manner that it can be clearly seen. The inlet structure shall be marked or stencilled according to the format applied by the Non Point Source Program to existing storm water drainage wells (MOU Part A, Section C(4)). If required, the associated ground water monitoring well shall have a locked water tight cap and shall be permanently marked with the legend "MONITOR WELL FOR STORM WATER DRAINAGE WELL."

Completion Report

In accordance with the general conditions of all well permits, the driller must complete State DWR Form 188 (Driller's Log) and submit the original to the Santa Clara Valley Water District within 30 days of the completion of the well. Because storm water drainage wells may have unusual or additional construction features, a drawing of the final as-built well shall be included with the DWR Form 188. If a monitoring well is required, it shall be identified clearly, by permit number and State Well Number, on the site plan for the storm water drainage well.

(Add to District Well Standards section titled "WELL DESTRUCTION STANDARDS" beginning on page 23.)

DESTRUCTION STANDARDS FOR STORM WATER DRAINAGE WELLS

When a storm water drainage well is no longer needed, if it has failed, or if conditions change so that a storm water drainage well would be prohibited at that location, then the storm water drainage well cannot be abandoned intact. All abandoned or unusable wells, including those that no longer meet their intended purpose, must be properly destroyed at the owner's expense, in accordance with the provisions of Ordinance 90-1, the District Well Standards, these Supplemental Well Standards, and "Guidelines for Closure of Shallow Disposal Wells," EPA-Region 9, 1992.

(Add to District Well Standards on page 23, after item 5.)

The following requirement for storm water drainage well destruction is added to the District Well Standards.

6. A storm water drainage well that no longer serves its original purpose or that poses a threat to groundwater.

(Add to District Well Standards at the end of page 29 after "Special Sealing Standards for Shallow Monitoring Wells.")

Special Sealing Standards for Storm Water Drainage Wells

Preliminary Work

1. Any surface structures, such as settling basins, grates, piping etc. shall be removed.

2. Because of the nature of construction of typical storm water drainage wells, with long perforated intervals by-passing the natural protection, these wells will have to be completely removed for proper destruction. All gravel or other filter material shall be removed to the total depth of the original storm water drainage well. All casing and gravel or filter material outside the casing shall be removed from the well-bore. Alternative destruction proposals for atypical (shallow) storm water drainage wells will be considered on a case-by-case basis.

3. Environmental samples shall be collected according to the protocols indicated and analyses specified in "Guidelines for Closure of Shallow Disposal Wells," EPA-Region 9, 1992. The results of the analytical sampling shall be submitted to the appropriate Regional Water Quality Control Board, to the City or County having jurisdiction, and to the District.

4. The resulting bore hole shall be filled using materials and methods specified on pages 26 and 28 of the District Well Standards. Where practical, it will be allowable to backfill a large diameter, shallow borehole with compacted low permeability soil. If this method is chosen, the plans, methods, and materials specifications shall be submitted with the well destruction permit.

CONTINUED USE OF STORM WATER DRAINAGE WELL

It is the responsibility of the owners of all existing storm water drainage wells (dry wells, storm water infiltration trenches and galleries, bubble-ups, etc.) in Santa Clara County to file a "Notice to Continue Use of a Dry Well" with the District Well Section prior to June 30, 1994. The District will forward copies of the "Notice" to the Regional Water Quality Control Boards and the U.S. EPA as required by Federal law (40 CFR 144.26).

Storm water drainage wells existing in high hazard areas, that is, in areas of chemical storage, handling, and use, or where chemical spills have occurred, may need to be properly destroyed immediately in accordance with these Supplemental Well Standards, the District Well Standard, and "Guidelines for Closure of Shallow Disposal Wells", EPA-Region 9, 1992. In accordance with the Memorandum of Understanding, Part A, the District and the Cities and County will identify, evaluate, and prioritize the need for investigations and proper monitoring or destruction of those storm water drainage wells which may pose a threat to groundwater quality.

All storm water drainage wells that have failed, were abandoned intact, or that are no longer needed, must be properly destroyed in accordance with District Ordinance 90-1, these Supplemental Well Standards, the District Well Standards, and "Guidelines for Closure of Shallow Disposal Wells," EPA-Region 9, 1992.